

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claims 6-7, 12 and 17 and AMEND the claims in accordance with the following:

1. (Currently Amended) A characteristic value identification method comprising:
 - a first process to prepare a government equation representing a functional model of a product part and having, at an input and an output on each side, a pair of a potential quantity and a flow quantity values, respectively, representing a strength and a quantity of energy applied to the product part;
 - a second process to convert the functional model into a steady functional model in a steady state by eliminating terms of a transient internal characteristic value in the government equation to identify a steady internal characteristic value of the government equation; and
 - a third process to identify the transient internal characteristic value in the government equation by using the steady internal characteristic value, wherein the third process includes:
 - a first step for preparing a transient test model to determine at least one transient internal characteristic value in the transient state of the government equation;
 - a second step for collecting transient test data by performing a test corresponding to the transient test model;
 - a third step for applying the steady internal characteristic value to the internal characteristic value of the transient test model to generate transient phenomenon reproduction data; and
 - a fourth step for correcting the transient phenomenon reproduction data based on an error between the transient phenomenon reproduction data and the transient test data, thereby identifying the transient internal characteristic value,
 - wherein when the error does not lie within an allowable range the fourth step repeatedly corrects a predetermined transient internal characteristic value within the transient phenomenon reproduction data until the error lies within the allowable range, and determines the transient internal characteristic value to be identified when the error lies within the allowable range

2. (Previously Presented) The characteristic value identification method as claimed in claim 1 wherein the second process includes;

a first step for preparing a steady test model to determine at least one steady internal characteristic value from the steady functional model;

a second step for collecting steady test data by performing a test corresponding to the steady test model; and

a third step for identifying a steady internal characteristic value of the government equation based on the steady test data.

3. (Cancelled)

4. (Currently Amended) The characteristic value identification method as claimed in claim 3 2 wherein the third step for identifying converts the government equation into a recurrence equation to determine the steady internal characteristic value from a recurrence coefficient of the recurrence equation.

5. (Currently Amended) The characteristic value identification method as claimed in claim 2 wherein the third step for identifying divides the steady internal characteristic value into a known factor and an unknown factor to identify the steady internal characteristic value of the unknown factor.

6-7 (Cancelled)

8. (Currently Amended) The characteristic value identification method as claimed in claim 7 1 wherein the fourth step preliminarily calculates a variance deviation, as a time history sensitivity, to an initial value at a time when each transient internal characteristic value is increased or decreased at a fixed ratio, and selects a transient internal characteristic value having a maximum sensitivity within the time history sensitivity as the predetermined transient internal characteristic value.

9. (Currently Amended) The characteristic value identification method as claimed in claim 7 1 wherein the fourth step preliminarily calculates a variance deviation, as a time history sensitivity, to an initial value at a time when each transient internal characteristic value is increased or decreased at a fixed ratio, and selects a transient internal characteristic value having the time history sensitivity similar to the error as the predetermined transient internal characteristic value.

10. (Original) The characteristic value identification method as claimed in claim 9 wherein the fourth step simultaneously selects a plurality of transient internal characteristic values having different maximum sensitivity times as the predetermined transient internal characteristic value.

11. (Currently Amended) A characteristic value identification apparatus comprising:
block replacement means for a functional model of a product part represented by a government equation having, at an input and an output on each side, a potential quantity and a flow quantity representing a strength and a quantity of energy applied to the product part;

test reproduction means for reproducing at least one steady test model in a steady state of the functional model and at least one transient test model in a transient state, the functional model being converted into the steady test model in a steady state by eliminating terms of a transient internal characteristic value in the government equation;

testing means of the product part for performing a steady test and a transient test respectively corresponding to the steady test model and the transient test model;

measurement means for collecting steady test data and transient test data at a time when a steady test and a transient test of the product part are performed by the testing means; and

calculating means for identifying a steady internal characteristic value of the steady test model by using the steady test data, for applying the steady internal characteristic value to the transient test model to generate transient phenomenon reproduction data, and for correcting the transient phenomenon reproduction data based on an error between the transient phenomenon reproduction data and the transient test data, thereby identifying a transient internal characteristic value.

wherein when the error does not lie within an allowable range the calculating means repeatedly corrects a predetermined transient internal characteristic value within the transient phenomenon reproduction data until the error lies within the allowable range, and determines the transient internal characteristic value to be identified when the error lies within the allowable range.

12. (Cancelled)

13. (Currently Amended) The characteristic value identification apparatus as claimed in claim 11 wherein the calculating means preliminarily calculates a variance deviation, as a time history sensitivity, to an initial value at a time when each transient internal characteristic value is

increased or decreased at a fixed ratio, and selects a transient internal characteristic value having a maximum sensitivity within the time history sensitivity as the predetermined transient internal characteristic value.

14. (Currently Amended) The characteristic value identification apparatus as claimed in claim 11 wherein the calculating means preliminarily calculates a variance deviation, as a time history sensitivity, to an initial value at a time when each transient internal characteristic value is increased or decreased at a fixed ratio, and selects a transient internal characteristic value having the time history sensitivity similar to the error as the predetermined transient internal characteristic value.

15. (Currently Amended) The characteristic value identification apparatus as claimed in claim 13 wherein the calculating means simultaneously selects a plurality of transient internal characteristic values having a different maximum sensitivity time as the predetermined transient internal characteristic value.

16. (Currently Amended) A virtual testing system which incorporates a functional model, as a virtual prototype, having an internal characteristic value identified by a characteristic value identification apparatus including: claimed in claim 11 comprising:

block replacement means for a functional model of a product part represented by a government equation having, at an input and an output on each side, a potential quantity and a flow quantity representing a strength and a quantity of energy applied to the product part;

test reproduction means for reproducing at least one steady test model in a steady state of the functional model and at least one transient test model in a transient state, the functional model being converted into the steady test model in a steady state by eliminating terms of a transient internal characteristic value in the government equation;

testing means of the product part for performing a steady test and a transient test respectively corresponding to the steady test model and the transient test model;

measurement means for collecting steady test data and transient test data at a time when a steady test and a transient test of the product part are performed by the testing means;
and

calculating means for identifying a steady internal characteristic value of the steady test model by using the steady test data, for applying the steady internal characteristic value to the transient test model to generate transient phenomenon reproduction data, and for correcting the transient phenomenon reproduction data based on an error between the transient phenomenon reproduction data and the transient test data, thereby identifying a transient internal

characteristic value, said virtual testing system comprising:

condition assigning means for assigning a driving operation condition and an environment condition to the characteristic value identification apparatus;

observation means for observing reproduction data obtained by the virtual prototype when the driving operation condition and the environment condition are assigned; and

evaluation means for evaluating an observation result of the observation means;

another measurement means for measuring actual machine test data at a time when the driving operation condition and the environment condition are provided to an actual machine which forms a subject of the virtual prototype, and

re-identification means of the virtual prototype,

the evaluation means comparing an output of the measurement means and the observation result, and making the re-identification means re-identify the virtual prototype according to the comparison result.

17. (Cancelled)

18. (Currently Amended) The virtual testing system as claimed in claim ~~17~~16 wherein a fixed virtual prototype is incorporated into a product part of a drive system and a load system connected to the product part as the virtual prototype, the testing means performs a test corresponding to the fixed virtual prototype, and the evaluation means at this time makes the re-identification means perform a re-identification according to the comparison result.

19-24. (Cancelled)